ORDER NO. ARD-7811082C

Service Manual

RP-070

Wireless Remote-Control Unit

RP-070 is designed for Model RS-M85, RS-9900US, RS-1500US, RS-1506US, RS-1700 and RS-1800.

Specifications (Catalog specifications for sales)

Transmitter (RP-070)

Power requirement:	DC; 3 V (UM-3×2) (two- "AA" size dry batteries)
Effective operation distance:	Max. 23 feet (7 m)
Functions:	Stop, pause, reverse (RS-1700 only), forward, rewind, fast-forward, record
Dimensions:	1-1/4"(H)×2-3/4"(W)×4-5/8"(D) [31mm(H)×68mm(W)×115mm(D)]
Weight:	5 oz (120 g) (without batteries)

Receiver (RP-070)

Power requirement:	DC; 9 V (UM-1×6) (six- "D" size dry batteries)
Dimensions:	2-1/8"(H)×17-7/8"(W)×6"(D) [53.1mm(H)×450mm(W)×150mm(D)]
Weight:	4 lbs. 7 oz (2 kg) (without batteries)
Cord length:	3 feet 4 inch (1 m)

Specifications are subject to change without notice.

Technics

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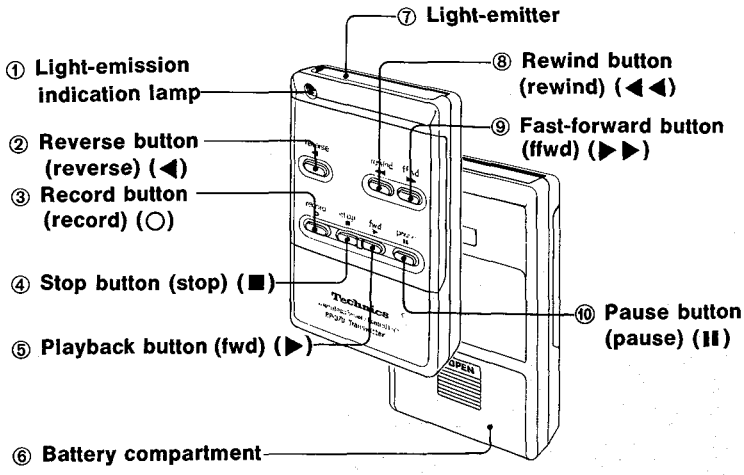
LOCATION OF CONTROLS AND COMPONENTS

TRANSMITTING UNIT


⑦ Light-emitter
① Light-emission indication lamp
⑧ Rewind button (rewind) (◀◀)
② Reverse button (reverse) (◀)
⑨ Fast-forward button (ffwd) (▶▶)
③ Record button (record) (○)
④ Stop button (stop) (■)
⑩ Pause button (pause) (II)
⑤ Playback button (fwd) (▶)
⑥ Battery compartment

RECEIVING UNIT

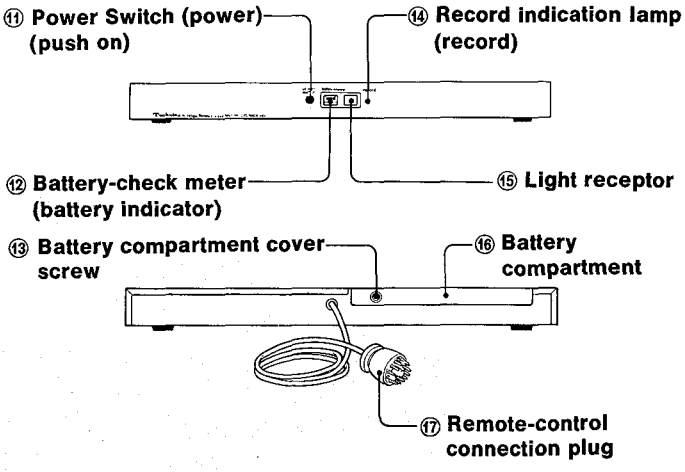

⑪ Power Switch (power) (push on)
⑭ Record indication lamp (record)
⑫ Battery-check meter (battery indicator)
⑮ Light receptor
⑬ Battery compartment cover screw
⑯ Battery compartment
⑰ Remote-control connection plug

Fig. 1

DISASSEMBLY INSTRUCTIONS

A. For Transmitting Unit (RP-070)

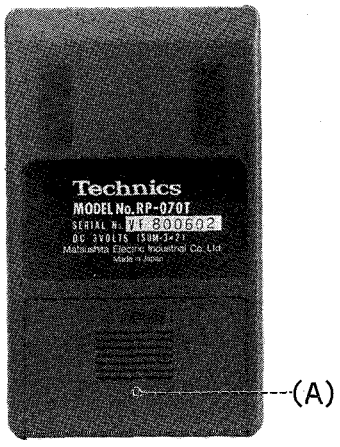


Fig. 2

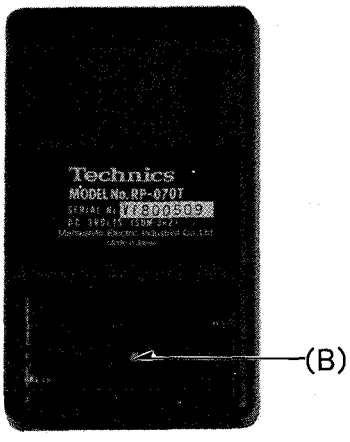


Fig. 3

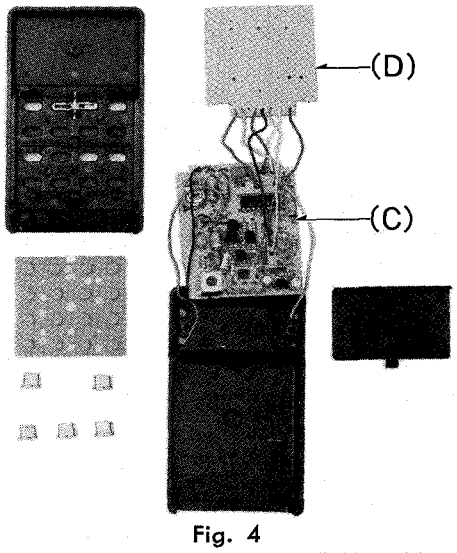


Fig. 4

Procedure	To remove ——.	Remove ——.	Shown in fig. ——.
1	Back cover	• Battery cover ..... (A) • 1 Screw ..... (B)	2 3
2	Buttones	• Main P.C.B. ..... (C) • P.C.B. for switch ..... (D)	4 4

B. For Receiving Unit (RP-070)

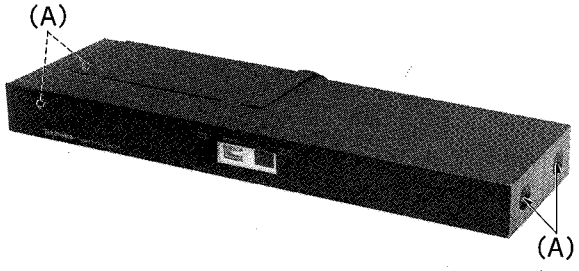


Fig. 5

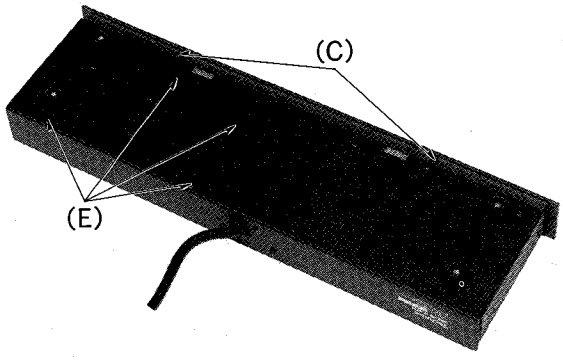


Fig. 6

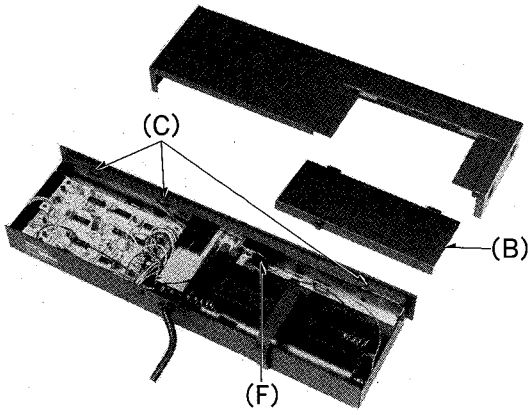


Fig. 7

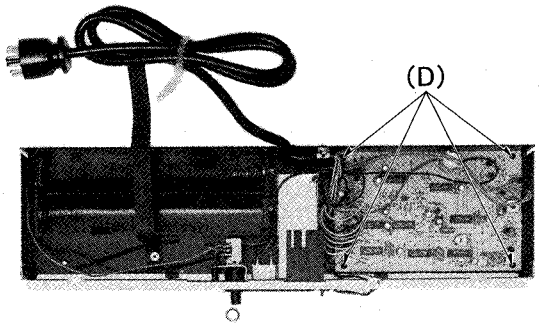


Fig. 8

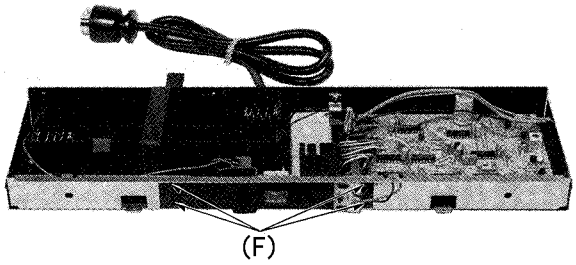


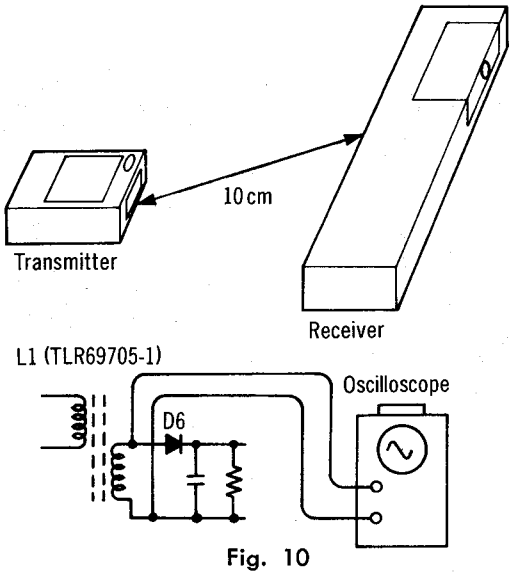
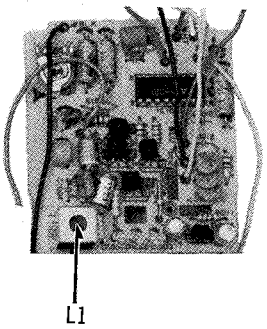
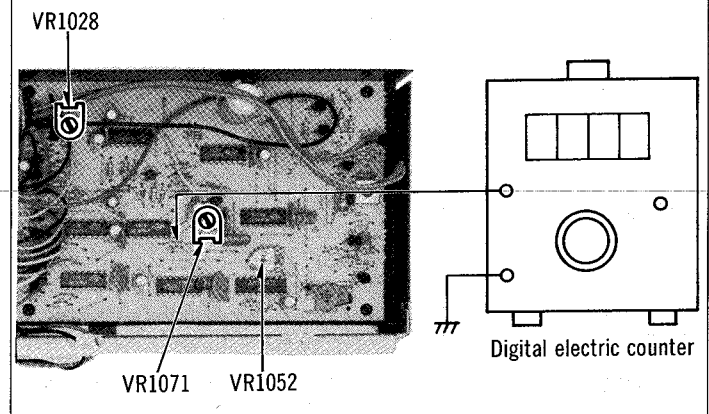
Fig. 9

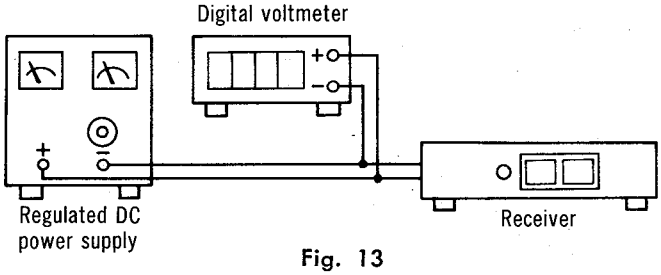
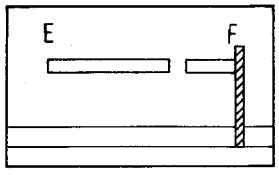
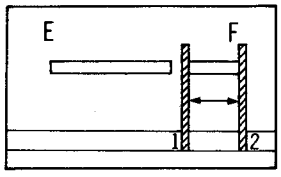
Procedure	To remove —— .	Remove —— .	Shown in fig. —— .
1	Case cover	• 4 black screws ····· (A) • Battery cover ····· (B)	5 7
2	Front panel	• 6 black screws ····· (C)	6, 7
3	Main amplifier	• 4 black screws ····· (D)	8
4	Battery case	• 4 black screws ····· (E)	6
5	Battery-check meter	• 5 black screws ····· (F)	7, 9

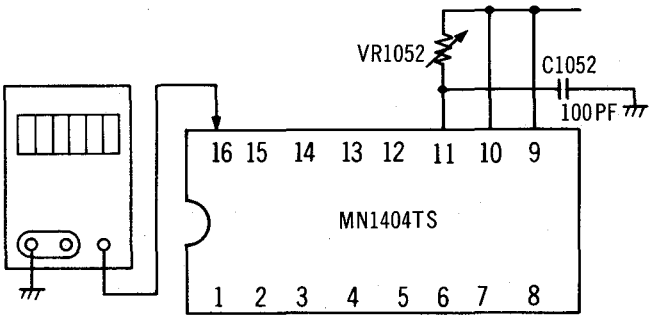
MEASUREMENT AND ADJUSTMENT METHOD

NOTE:

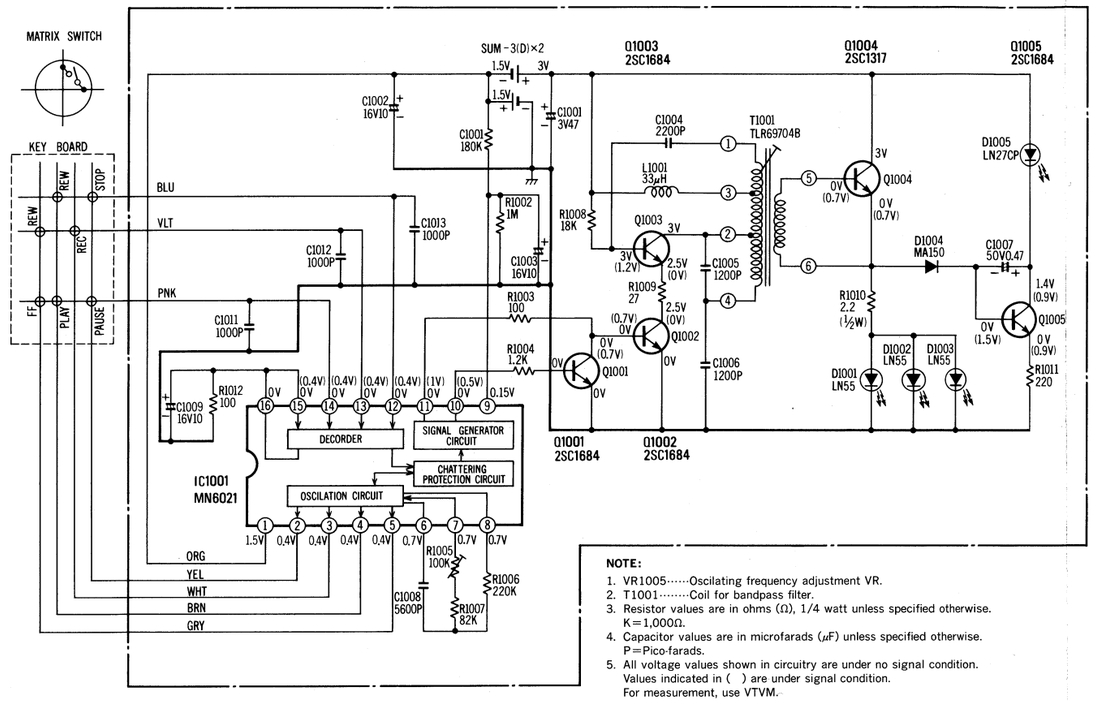
1. Take care that light from the transmitter is not directly applied to the receiver.
2. Do not touch the set.
3. Make the measurement and adjustment without removing the printed circuit board from the receiver or the transmitter.
4. The measurement should be made at temperatures in a range of 5～35℃ and humidity of 45～85% unless otherwise specified.
   Where a delicate reading is needed, however, the temperature and humidity specifications are to be 20±2℃ and 65±5% respectively.

ITEM	MEASUREMENT & ADJUSTMENT	REMARKS
Receiver sensitivity adjustment Equipment: * Transmitter (RP-070) * Receiver (RP-070) * Oscilloscope or VTVM * Regulated DC power supply	1. Test equipment connection is shown below.  **Fig. 10** 2. Put the transmitter and receiver with their light emitting and receiving sections facing each other at a specific distance (10 cm). 3. Switch on the transmitter and then adjust the coil core L1 (TLR 69705-1) of the band pass filter circuit so that the output voltage is maximum on the VTVM or oscilloscope.	 **Fig. 11**
Adjustment of transmitter's inhibition time Equipment: * Transmitter (RP-070) * Receiver (RP-070) * Memory scope or counter or oscilloscope * Regulated DC power supply or new battery	1. Test equipment connection is shown below.  **Fig. 12**	

ITEM	MEASUREMENT & ADJUSTMENT	REMARKS
	2. Connect a new battery or power supply line to the input. 3. Connect a memory scope, counter or oscilloscope to the specified portion of the printed circuit board. 4. Emit the signal from the transmitter 3 times a second. Then, adjust semi-fixed resistor VR1071 so that the indication of the counter is within the specification. 5. Criterion. The output time of the counter should be 98～103 msec.	
	Precautions 1. The signal from the transmitter should be emitted at least 3 times a second. 2. The temperature during measurement should be 20±8℃. 3. The inhibition time of the first signal should not exceed 115 msec. 4. In the case of a unit of low impedance, the measurement and input adjustment should be carefully made because the value of resistance of the time constant is larger than MΩ ($10^6\Omega$). 5. The 1st, 2nd and 3rd signals from the transmitter vary in inhibition time. Therefore, suitable intervals should be observed for signal emission.	
Adjustment of level meter indication Equipment: * Receiver (RP-070) * Regulated DC power supply * Digital voltmeter	1. Test equipment connection is shown below.  **Fig. 13** 2. Adjust the power supply voltage so that the digital voltmeter indicates 10 V. 3. Turn on the power switch and the receiver. 4. Adjust the semi-fixed volume of R1028 so that the level meter indicates the position shown at fig. 14. 5. Criterion. When the power supply voltage is 10.0±0.3 V, the meter's pointer should be within the range of 1～2 as shown at fig. 15.	Battery indicator  **Fig. 14**  **Fig. 15**
	Precautions 1. The meter should be observed from in front. 2. Care should be taken not to apply over current to the meter. 3. The meter should be used without removing it from the set.	

ITEM	MEASUREMENT & ADJUSTMENT	REMARKS
Oscillation frequency adjustment Equipment: * Receiver (RP-070) * Regulated DC power supply or brand new battery * Oscilloscope	**Oscillation frequency adjustment for MN1404 of receiver.** (Adjustment of MN1404TS which serves as a check on "1" and "0" of input signal) 1. Test equipment connection is shown below.  **Fig. 16** 2. Switch on the transmitter. 3. Make the adjustment so that the period time of the clock frequency can be read on the oscilloscope. 4. Adjust the semi-fixed resistor (VR1052) from No. 11 pin a MN1404TS so that the output of No. 16 pin is 16±0.2 ms on the oscilloscope. 5. Criterion The period time of clock frequency should be within 16±0.2 ms.	
	Precautions 1. Each measuring instrument should not be used for at least 15 minutes after switching it on. 2. A brand new 9 V battery or regulated DC power supply (9 V output) should be used as the power source. 3. The measurements should be done under normal temperature and humidity conditions. 4. The equipment should be completely earthed.	

SCHEMATIC DIAGRAM MODEL RP-070 (TRANSMITTER)



NOTE:

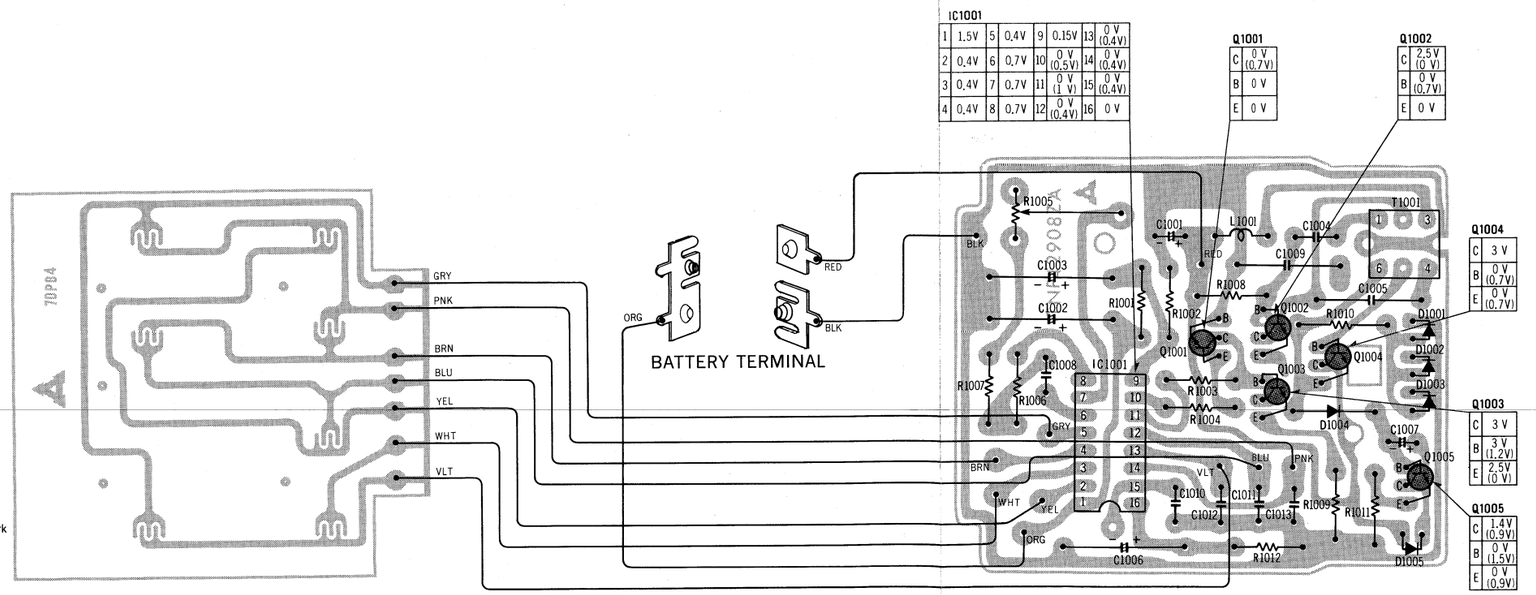
1. VR1005·····Oscilating frequency adjustment VR.
2. T1001·····Coil for bandpass filter.
3. Resistor values are in ohms (Ω), 1/4 watt unless specified otherwise. K=1,000Ω.
4. Capacitor values are in microfarads (μF) unless specified otherwise. P=Pico-farads.
5. All voltage values shown in circuitry are under no signal condition. Values indicated in ( ) are under signal condition. For measurement, use VTVM.

NOTE: RESISTORS
ERD ··· Carbon
ERG ··· Metal-oxide
ERO ··· Metal-film
ERX ··· Metal-film
ERQ ··· Fuse type metallic
ERC ··· Solid
ERF ··· Cement

CAPACITORS
ECG□ ····· Ceramic
ECK□ ····· Ceramic
ECC□ ····· Ceramic
ECF□ ····· Ceramic
ECQM ····· Polyster
ECQE ····· Polyster
ECQF ····· Polypropylene
ECE□ ····· Electrolytic
ECE□N ··· Non polar electrolytic
ECQS ····· Polystyrene
ECS□ ····· Tantalum

Ref. No.	Part No.
RESISTORS	
R1001	ERD25TJ184
R1002	ERD25TJ105
R1003	ERD25TJ101
R1004	ERD25TJ122
R1006	ERD25TJ224
R1007	ERD25TJ823
R1008	ERD25TJ183
R1009	ERD25TJ270
R1010	ERD25TJ2R2
R1011	ERD25TJ221
R1012	ERD25TJ101
VARIABLE RESISTOR	
VR1005	EVTS3MA00B15
CAPACITORS	
C1001	ECSZ3EF47
C1002, 1003	ECEB1ES100
C1004	ECQM05222KZ
C1005, 1006	ECQS1122JZ
C1007	ECEA50ZR47
C1008	ECQM05562KZ
C1009	ECEB1ES100
C1011, 1012, 1013	ECKD1H102KB

WIRING CONNECTION DIAGRAM MODEL RP-070 (TRANSMITTER)



IC1001							
1	1.5V	5	0.4V	9	0.15V	13	0V (0.4V)
2	0.4V	6	0.7V	10	0V (0.5V)	14	0V (0.4V)
3	0.4V	7	0.7V	11	0V (1V)	15	0V (0.4V)
4	0.4V	8	0.7V	12	0V (0.4V)	16	0V

Q1001	
C	0V (0.7V)
B	0V
E	0V

Q1002	
C	2.5V (0V)
B	0V (0.7V)
E	0V

Q1004	
C	3V
B	0V (0.7V)
E	0V (0.7V)

Q1003	
C	3V
B	3V (1.2V)
E	2.5V (0V)

Q1005	
C	1.4V (0.9V)
B	0V (1.5V)
E	0V (0.9V)

NOTE:
BLK ····· Black
BLU ····· Blue
BRN ····· Brown
GRY ····· Gray
GRN ····· Green
L. BLU ··· Light Blue
NIL ····· No Color Mark
ORG ····· Orange
PNK ····· Pink
RED ····· Red
SLD ····· Shield Wire
VLT ····· Violet
WHT ····· White
YEL ····· Yellow

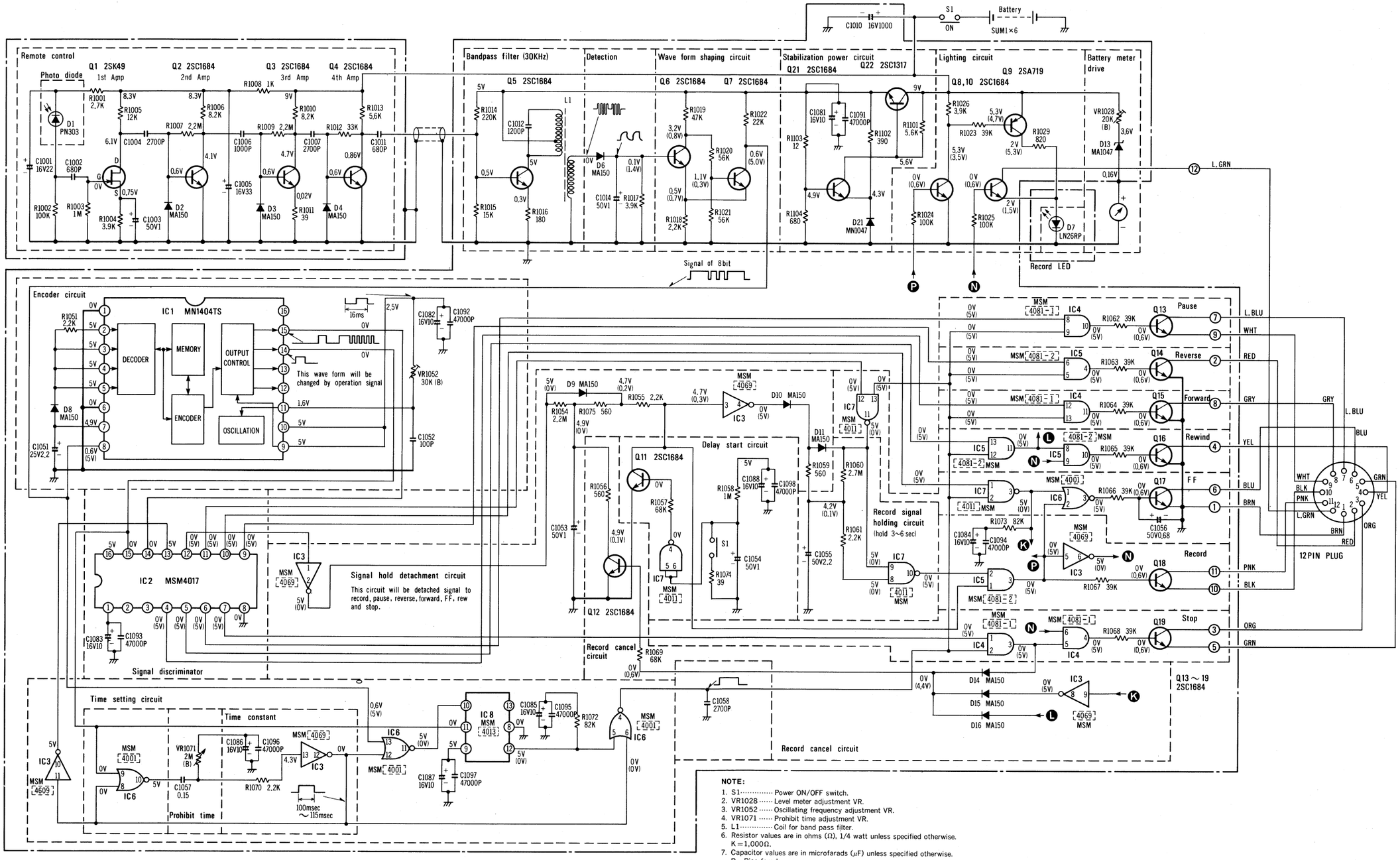
NOTE:
The circuit shown in red on the conductor is B circuit.
Values indicated in ▭ are DC voltage between the chassis and electrical parts.
Values indicated in ( ) are under signal condition.

Ref. No.	Part No.	Part Name & Description
TRANSISTORS		
Q1001, 1002, 1003	2SC1684	Transistor
Q1004	2SC1318	〃
Q1005	2SC1684	〃
INTEGRATED CIRCUIT		
IC1001	MN6021	Integrated Circuit (MOS LSI)
DIODES		
D1001, 1002, 1003	LN55	Diode
D1004	MA150	〃
D1005	LN270CP	〃
TRANSFORMER		
T1001	EL060330K	Oscillator Transformer
COIL		
L1001	ELM10S325CT	Coil

SCHEMATIC DIAGRAM MODEL RP-070 (RECEIVER)

NOTE: RESISTORS
ERD ··· Carbon
ERG ··· Metal-oxide
ERO ··· Metal-film
ERX ··· Metal-film
ERQ ··· Fuse type metallic
ERC ··· Solid
ERF ··· Cement

CAPACITORS
ECG□ ····· Ceramic
ECK□ ····· Ceramic
ECC□ ····· Ceramic
ECF□ ····· Ceramic
ECQM ····· Polyster
ECQE ····· Polyster
ECQF ····· Polypropylene
ECE□ ····· Electrolytic
ECE□N ··· Non polar electrolytic
ECQS ····· Polystyrene
ECS□ ····· Tantalum



NOTE:

1. S1 ····· Power ON/OFF switch.
2. VR1028 ····· Level meter adjustment VR.
3. VR1052 ····· Oscillating frequency adjustment VR.
4. VR1071 ····· Prohibit time adjustment VR.
5. L1 ····· Coil for band pass filter.
6. Resistor values are in ohms (Ω), 1/4 watt unless specified otherwise. K=1,000Ω.
7. Capacitor values are in microfarads (μF) unless specified otherwise. P=Pico-farads.
8. All voltage values shown in circuitry are under no signal condition. Values indicated in ( ) are under signal condition. For measurement, use VTVM.

Ref. No.	Part No.
RESISTORS	
R1001	ERD25TJ272
R1002	ERD25TJ104
R1003	ERD25TJ105
R1004	ERD25TJ392
R1005	ERD25TJ223
R1006	ERD25TJ822
R1007	ERD25TJ225
R1008	ERD25TJ102
R1009	ERD25TJ225
R1010	ERD25TJ822
R1011	ERD25TJ390
R1012	ERD25TJ333
R1013	ERD25TJ562
R1014	ERD25TJ224
R1015	ERD25TJ153
R1016	ERD25TJ181
R1017	ERD25TJ392
R1018	ERD25TJ222
R1019	ERD25TJ473
R1020, 1021	ERD25TJ563
R1022	ERD25TJ223
R1023	ERD25TJ393
R1024, 1025	ERD25TJ104
R1026	ERD25TJ392
R1029	ERD25TJ821
R1051	ERD25TJ222
R1054	ERD25TJ225
R1055	ERD25TJ222
R1056	ERD25TJ561
R1057	ERD25TJ683
R1058	ERD25TJ105
R1059	ERD25TJ561
R1060	ERD25TJ275
R1061	ERD25TJ222
R1062, 1063, 1064, 1065, 1066, 1067, 1068	ERD25TJ393
R1069	ERD25TJ683
R1070	ERD25TJ222
R1072, 1073	ERD25TJ823
R1074	ERD25TJ390
R1075	ERD25TJ561
R1101	ERD25TJ562
R1102	ERD25TJ391
R1103	ERD25TJ123
R1104	ERD25TJ684
VARIABLE RESISTORS	
VR1028	EVNK4AA00B24
VR1052	EVTS3AA00B34
VR1071	EVNK4AA00B26
CAPACITORS	
C1001	ECEA1ES220
C1002	ECKD1H681KB
C1003	ECEA50Z1
C1004	ECKD1H272KB
C1005	ECEA1CS330
C1006	ECKD1H102KB
C1007	ECKD1H272KB
C1010	ECEA1CS102
C1011	ECKD1H681KB
C1012	ECQS1122JZ
C1014	ECEA50Z1
C1051	ECEA25V2R2
C1052	ECQS1101JZ
C1053, 1054	ECEA50Z1
C1055	ECEA25V2R2
C1056	ECEA50ZR68
C1057	ECQM05154KZ
C1058	ECKD1H272KB
C1081, 1082, 1083, 1084, 1085, 1086, 1087, 1088	ECEA1HS100
C1091, 1092, 1093, 1094, 1095, 1096, 1097, 1098, 1099	ECKD1H473KB

WIRING CONNECTION DIAGRAM MODEL RP-070 (RECEIVER)

Ref. No.	Part No.	Part Name & Description
	TRANSISTORS	
Q1	2SK49	Transistor
Q2, 3, 4, 5, 6, 7, 8	2SC1684	〃
Q9	2SA719	〃
Q10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 21	2SC1684	〃
Q22	2SC1317	Transistor
	INTEGRATED CIRCUITS	
IC1	MN1404TS	Integrated Circuit
IC2	MSM4017	〃
IC3	MSM4069	〃
IC4, 5	MSM4081	〃
IC6	MSM4001	〃
IC7	MSM4011	〃
IC8	MSM4013	〃
	DIODES	
D1	PN303	Diode
D2, 3, 4, 6	MA150	〃
D7	LN26RP	〃 (LED)
D8, 9, 10, 11	MA150	〃
D13	MN1047	〃
D14, 15, 16	MA150	〃
D21	MN1047	〃
	COIL	
L1	TLR69705-1	Coil
	SWITCH	
S1	ESB7144	Power ON/OFF Switch

IC1

1	0 V	9	5 V
2	5 V	10	5 V
3	5 V	11	1.6 V
4	5 V	12	—
5	5 V	13	—
6	0 V	14	0 V
7	4.9 V	15	0 V
8	0.6 V (5 V)	16	—

IC2

1	—	9	0 V (5 V)
2	—	10	0 V (5 V)
3	—	11	0 V (5 V)
4	0 V (5 V)	12	0 V (5 V)
5	0 V (5 V)	13	5 V
6	0 V (5 V)	14	0 V
7	0 V (5 V)	15	0 V
8	0 V	16	5 V

IC3

1	0 V (5 V)	8	0 V (5 V)
2	5 V (0 V)	9	—
3	4.7 V (0.3 V)	10	5 V
4	0 V (5 V)	11	0 V
5	0 V (5 V)	12	0 V
6	5 V (0 V)	13	4.3 V

IC4

1	0 V (5 V)	8	0 V (5 V)
2	0 V (4.4 V)	9	0 V (5 V)
3	0 V (5 V)	10	0 V (5 V)
4	0 V (5 V)	11	0 V (5 V)
5	0 V (5 V)	12	0 V (5 V)
6	5 V (0 V)	13	0 V (5 V)

IC5

1	—	8	0 V (5 V)
2	0 V (5 V)	9	5 V (0 V)
3	0 V (5 V)	10	0 V (5 V)
4	0 V (5 V)	11	0 V (5 V)
5	0 V (5 V)	12	—
6	0 V (5 V)	13	0 V (5 V)

IC6

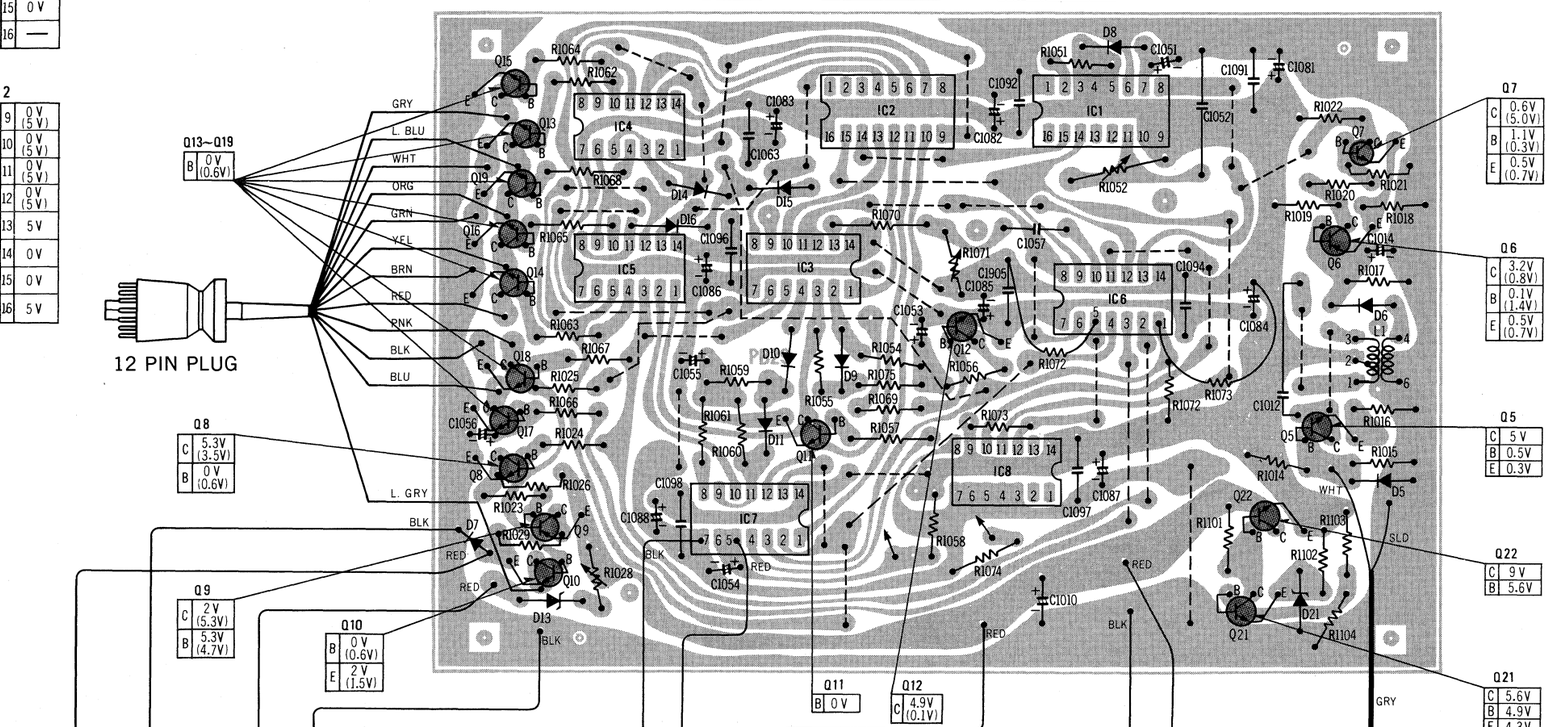
1	5 V (0 V)	8	0 V
2	0 V (5 V)	9	0 V
3	0 V (5 V)	10	—
4	—	11	5 V (0 V)
5	—	12	0 V
6	0 V (0 V)	13	0.6 V (5 V)

IC7

1	0 V (5 V)	8	5 V (0 V)
2	—	9	5 V (0 V)
3	5 V (0 V)	10	0 V (5 V)
4	0 V	11	5 V (0 V)
5	—	12	0 V (5 V)
6	—	13	0 V (5 V)

IC8

1	—	8	0 V
2	—	9	5 V
3	—	10	5 V (0 V)
4	—	11	0 V
5	—	12	5 V (0 V)
6	—	13	—



NOTE:

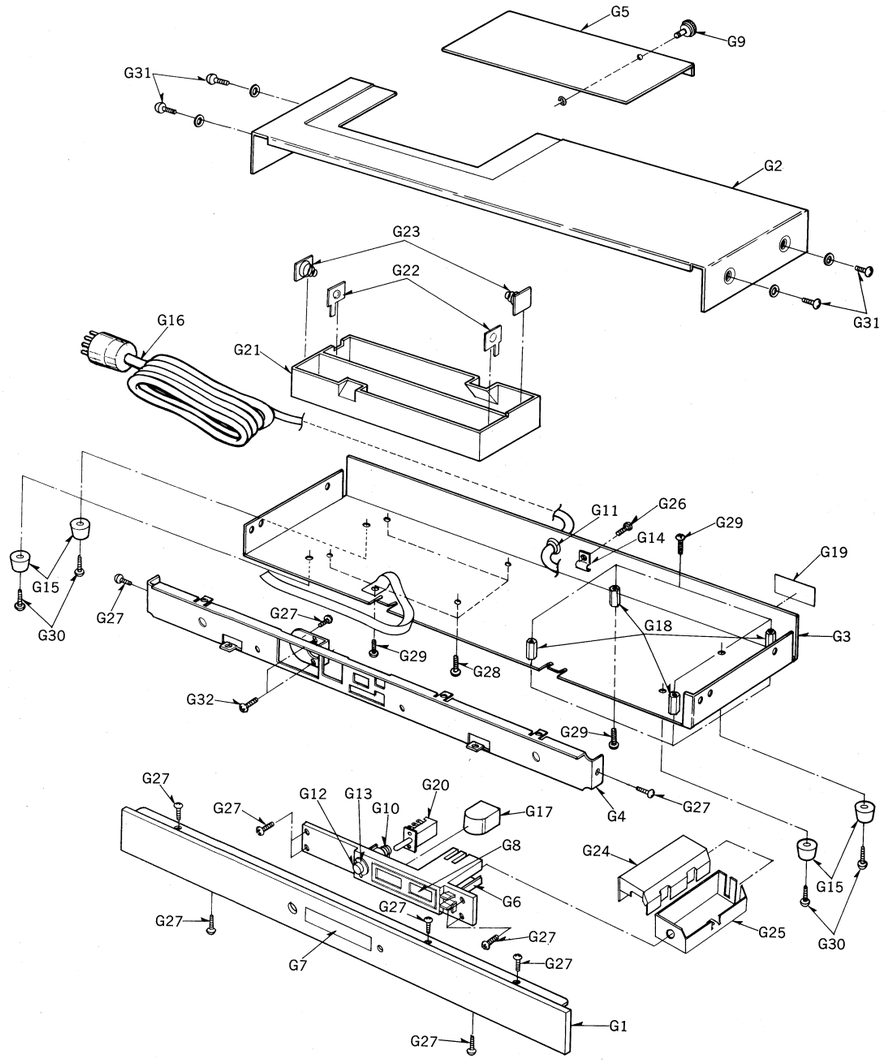
BLK ····· Black
BLU ····· Blue
BRN ····· Brown
GRY ····· Gray
GRN ····· Green
L. BLU ··· Light Blue
NIL ····· No Color Mark
ORG ····· Orange
PNK ····· Pink
RED ····· Red
SLD ····· Shield Wire
VLT ····· Violet
WHT ····· White
YEL ····· Yellow

NOTE:

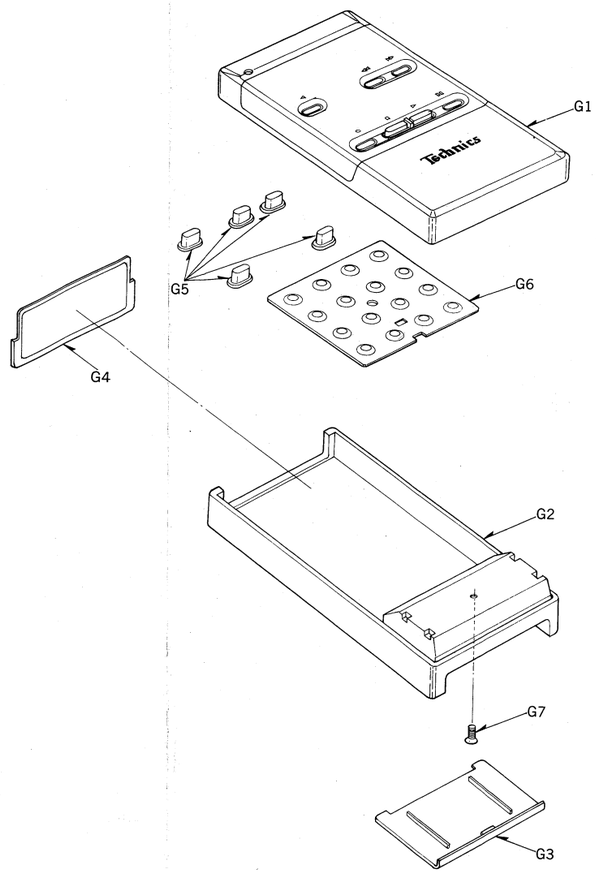
The circuit shown in red on the conductor is B circuit.
Values indicated in ▭ are DC voltage between the chassis and electrical parts.
Values indicated in ( ) are under signal condition.

CABINET PARTS

FOR TRANSMITTER



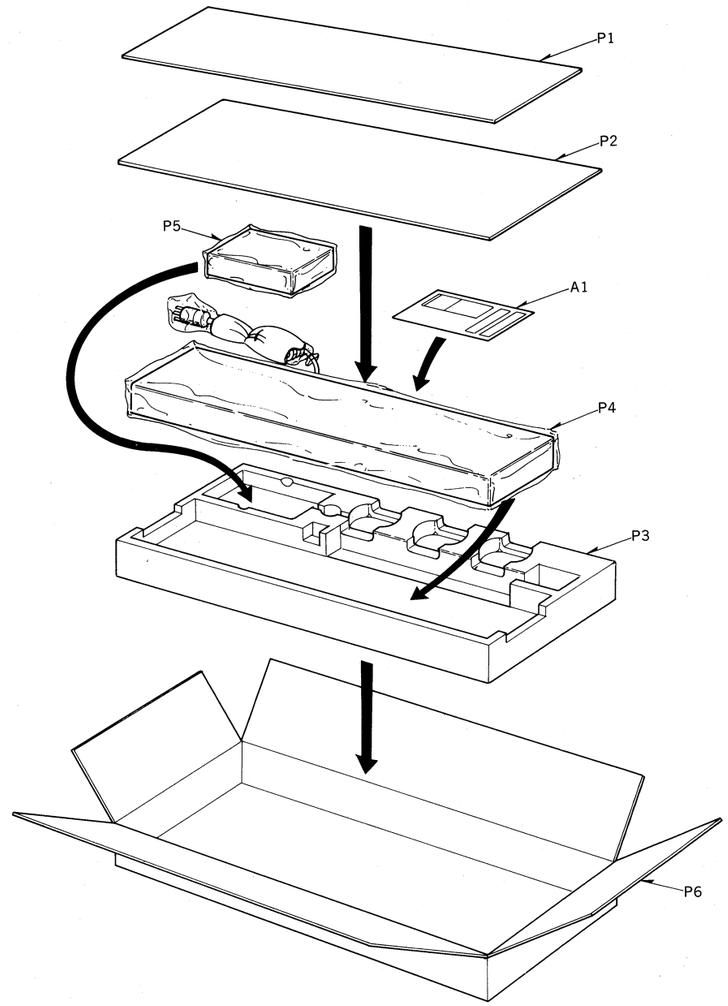
FOR RECEIVER



Ref. No.	Part No.	Part Name & Description
	CABINET PARTS	
G1	URD70TP1	Front Panel
G2	URD70CU2	Case Cover
G3	URD70CH3	Bottom Cover
G4	URD70MF4	Front Plate
G5	URD70EC5	Battery Cover Assembly
G6	URD70HG6	Housing
G7	URD70CV7	Cover
G8	URD70SB8	Filter Plate
G9	URD70TP9	Pinch for Battery Cover
G10	URD70BN10	Spring
G11	URD70GB11	Cord Bushing
G12	URD70VBT1	Button Assembly
G13	URD70GG14	Button Guide
G14	URD70TK15	Cord Stopper
G15	URD70TD16	Rubber Foot
G16	URD70VP2	Plug Cord Assembly
G17	URD70MT18	Meter
G18	URD70SS45	Spacer
G19	URD70LB24	Name Plate
G21	URD70BC26	Battery Case
G22	URD70TD27	Battery Terminal
G23	URD70BN28	Battery Spring
G24	URC2CH100	Shield Case (Upper)
G25	URC2CH101	Shield Case (Lower)
G26	XSN3+8S	Screw ⊕3×8
G27	XTN3+5B	Tapping Screw ⊕3×5
G28	XTN3+8B	Tapping Screw ⊕3×8
G29	XSN3+5BVS	Screw ⊕3×5
G30	XSN4+8S	Screw ⊕4×8
G31	XSB4+8BVS	〃
G32	XSN3+4S	Screw ⊕3×4

Ref. No.	Part No.	Part Name & Description
	CABINET PARTS	
G1	URC70VCS2	Upper Case Assembly
G2	URC70VCS3	Lower Case Assembly
G3	URC70EC3	Battery Cover Assembly
G4	URC160SB6	Filter Plate
G5	URC160BT5	Button
G6	URC160CT11	Rubber Contact
G7	XSS3+8S	Tapping Screw ⊕3×8

COMPONENT PACKINGS



Ref. No.	Part No.	Part Name & Description
	ACCESSORY	
A1	QQT2375	Instruction Book
	PACKINGS	
P1	URD70PC646	Spacer
P2	URD70PC630	Inner Cushion (Upper)
P3	URD70PC631	Inner Cushion (Lower)
P4	URD70PC1834	Poly Bag for RP-070 (Receiver)
P5	URC160XF38	Poly Bag for RP-070 (Transmiter)
P6	URD70PC132	Packing Case

PCN Printed in Japan.